

2016

WISCONSIN

FIRE WEATHER OPERATING PLAN

AGENCIES PARTICIPATING IN THIS PLAN INCLUDE: THE NATIONAL WEATHER SERVICE, WISCONSIN DEPARTMENT OF NATURAL RESOURCES, THE DEPARTMENT OF THE INTERIOR'S BUREAU OF INDIAN AFFAIRS, FISH AND WILDLIFE SERVICE, AND THE NATIONAL PARK SERVICE, AND THE DEPARTMENT OF AGRICULTURE, FOREST SERVICE.

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I. INTRODUCTION

The National Weather Service (NWS) is legally mandated to provide a Fire Weather Program and there is a requirement from the customers for the NWS to supply the fire weather services. This annual operating plan describes the policies, procedures and relationship the NWS will have with the federal wildland fire management agencies, as well as with the state of Wisconsin wildland fire management agencies. This operating plan complies with and complements the Interagency Agreement for Meteorological Services. Those involved in the interagency agreement with the Department of Commerce, National Oceanic Atmospheric Administration-NWS are the Department of the Interior's Bureau of Land Management, Bureau of Indian Affairs, Fish and Wildlife Service, and the National Park Service, and the Department of Agriculture, Forest Service.

The Operating Plan is updated annually, and is reviewed by representatives of the NWS and each user agency prior to the onset of the spring fire season. All parties should have a copy of this plan available for reference purposes. Each fire management agency receiving this plan will be responsible for duplicating and distributing this plan to its field offices, which require NWS forecasts.

A. SUMMARY OF CHANGES FOR 2016

1. The dryness of the fuels will be determined by analyzing the Fine Fuel Moisture Code (FFMC) of the Canadian Forest Fire Danger Rating System (CFFDRS). Fire season 2016 will be another year in using FFMC. When the FFMC reaches 92, this will be the trigger point for agencies to collaborate to determine if a Red Flag Watch should be issued. A FFMC of 94 or higher has been identified as the predictable level that would commonly represent a Red Flag Warning.
2. There will be 5 AM (morning) and 2 PM (afternoon) fuel and headline coordination deadlines for Fire Weather Watch and Red Flag Warning situations. Initial phone calls to Jim Barnier (WDNR) and Jim Grant (USFS) need to occur by 3 AM (morning) and 12 PM (afternoon). Heads-up e-mail messages should be sent by NWS offices to user agencies as early as possible (hopefully a couple of days in advance), alerting to the possibility of upcoming Fire Weather Watch and Red Flag Warning conditions. This will facilitate earlier fuel coordination. In addition, the "10-15 minute" collaboration period wording in the paragraph above this one, on page 23, was removed. It now just states, "collaboration period."

3. A note will be used, in the discussion section of the Fire Weather Narrative Forecast products, to alert for YouTube video briefings, or other special briefings, for the more critical fire weather days.
4. In the "Other Factors" section below the Fire Weather Watch/Red Flag Warning criteria on page 22, added: 1) "Frequent wind gusts in excess of 25 mph are expected" and 2) Adjusted the "trees falling on power lines" gusty winds thresholds to "in excess of 35 mph (low end threshold), or in excess of 45 mph (high end threshold)."
5. Updates were made to Chapter III, Part 6 (Special Services), Part 7 (Training) and Appendix A of Chapter III (Guidelines For Teaching Interagency Courses) to reflect the latest information.
6. Website links and contact information were updated throughout this document.

II. ORGANIZATIONAL DIRECTORY

A. NWS OFFICES AND POINTS OF CONTACT

1. WFO MILWAUKEE/SULLIVAN Backup Office: WFO Green Bay

National Weather Service
N3533 Hardscrabble Road.
Dousman, WI 53118
Phone Number...262-965-2197
Internet Address: <http://www.weather.gov/mkx/fire>

Meteorologist-in-Charge (Acting): Timothy Halbach	timothy.j.halbach@noaa.gov
Fire Weather Focal Point: J. J. Wood	james.wood@noaa.gov
Assistant Fire Weather FP: Mark Gehring	mark.g.gehring@noaa.gov

2. WFO LA CROSSE Backup Office: WFO Des Moines

National Weather Service
N2788 County Road FA
La Crosse, WI 54601
Phone Number...608-784-8292
Internet Address: <http://www.weather.gov/arx/fire>

Meteorologist-in-Charge: Glenn Lussky
Fire Weather Focal Point: John Wetenkamp
Assistant Fire Weather FP: Dave Schmidt

glenn.lussky@noaa.gov
john.wetenkamp@noaa.gov
dave.schmidt@noaa.gov

3. WFO GREEN BAY

Backup Office: WFO Milwaukee/Sullivan

National Weather Service
2485 South Point Road
Green Bay, WI 54313-5522
Phone Number...920-497-8771
Internet Address: <http://www.weather.gov/grb/fire>

Meteorologist-in-Charge: Matt Lorentson matthew.lorentson@noaa.gov
Fire Weather Focal Point: Tim Kieckbusch tim.kieckbusch@noaa.gov
Assistant Fire Weather FP: Tom Helman tom.helman@noaa.gov
Assistant Fire Weather FP: Tasos Kallas tasos.kallas@noaa.gov
Assistant Fire Weather FP: Sean Luchs sean.luchs@noaa.gov

4. WFO TWIN CITIES/CHANHASSEN

Backup Office: WFO Duluth

National Weather Service
1733 Lake Drive West
Chanhassen, MN 55317
Phone Number...952-361-6671
Internet Address: <http://www.weather.gov/mpx/fire>

Meteorologist-in-Charge: Dan Luna daniel.luna@noaa.gov
Fire Weather Focal Point: Mike Griesinger michael.griesinger@noaa.gov

5. WFO DULUTH

Backup Office: WFO Twin Cities/Chanhassen

National Weather Service
5027 Miller Trunk Highway
Duluth, MN 55811
Phone Number...218-729-0653
Internet Address: <http://www.weather.gov/dlh/fire>

Meteorologist-in-Charge: Mike Stewart michael.stewart@noaa.gov
Fire Weather Focal Point: Amanda Graning amanda.graning@noaa.gov
Assistant Fire Weather FP: Geoff Grochocinski geoffrey.grochocinski@noaa.gov

6. WFO DES MOINES

Backup Office: WFO La Crosse

National Weather Service
9607 NW Beaver Drive
Johnston, IA 50131
Internet Address: <http://www.weather.gov/dmx/fire>

Meteorologist-in-Charge: Ken Harding kenneth.harding@noaa.gov
Fire Weather Focal Point: Frank Boksa frank.boksa@noaa.gov

7. OTHER IMPORTANT NWS CONTACTS

Larry Van Bussum, Operations Section Chief – National Weather Service Fire Weather
National Interagency Fire Center (NIFC)
3833 South Development Avenue, Bldg 3807
Boise, ID 83705-5354
E-mail: Larry.Vanbussum@noaa.gov
National Fire Weather website: <http://www.srh.noaa.gov/ridge2/fire>

Chris Foltz, Fire Weather Program Manager
National Weather Service,
Central Region Headquarters
7220 NW 101st Terrace
Kansas City, MO 64153
Email: Christopher.Foltz@noaa.gov
Central Region website: <http://www.weather.gov/crh/>

Heath Hockenberry
National Fire Weather Program Leader
National Weather Service
3833 South Development Ave.
Boise, ID 83705
E-mail: Heath.Hockenberry@noaa.gov

B. PARTICIPATING AGENCIES

1. U.S. Forest Service (USFS)
 - a. Chequamegon-Nicolet National Forests in northern Wisconsin
2. U.S. Fish and Wildlife Service (USFWS)
 - a. Necedah National Wildlife Refuge in Juneau County
 - b. Horicon National Wildlife Refuge in Dodge County
 - c. Leopold Wetland Management District in Columbia County

3. Bureau of Indian Affairs (BIA)
4. National Park Service (NPS)
5. Wisconsin Department of Natural Resources (WDNR)

CONTACTS FOR THESE AGENCIES ARE LOCATED IN THE APPENDIX.

III. SERVICES PROVIDED BY THE NWS

A. Basic Services

This section describes the fire weather products and services provided by the NWS as described in National Weather Service Directive NWSI 10-401. Since there are no full-time forecasters devoted solely to fire weather, fire weather duties are scheduled among other warning and forecast responsibilities. **However, spot forecasts for wildfires are treated with a high priority.**

Fire weather forecasts will be prepared by the NWS for various fire control agencies in Wisconsin on a seasonal time schedule from early spring to late fall. Start-up and termination of the fire weather season is mainly dictated by snow coverage across Wisconsin and will be requested by the fire control agencies. The fire control agencies (i.e. WDNR, USFS) shall provide the NWS at least one week of advanced notice prior to the start-up of the fire season.

History indicates spring to be the most active season for fire weather, since dead fuels are abundant and the relative humidity is sometimes quite low. Fall is another peak time for fire weather, due to a new source of fuel from dead vegetation as a result of freeze damage.

Here are the general time periods for each season:

Spring season	March 15 to June 15
Summer season	June 15 to September 1
Fall season	September 1 through Thanksgiving weekend

The NWS is responsible for routine and non-routine forecasts, which include the Fire Weather Planning Forecast (FWF), NFDRS point forecasts (FWM), Spot Forecasts (FWS) for prescribed burning and wildfires, Fire Weather Watches (RFW), and Red Flag Warnings (RFW). Most of these products will be available on the Weather Information Management System (WIMS) and/or the internet web sites of the NWS and Eastern Area Coordination Center (EACC). The NWS websites are listed in the Organizational Directory.

The website for the EACC in the Great Lakes region is:

<http://gacc.nifc.gov/eacc/>

Some additional fire weather forecasts that can be obtained on this web site are the weekly, monthly and seasonal **fire potential outlooks**. Fire weather agencies are encouraged to remain informed on these outlooks.

Table 1 below outlines the responsibilities of each NWS office and their respective geographic area. Figure 1 also indicates area of responsibility.

Table 1. Forecast times, product identifiers and area responsibility of NWS offices

Office	7:00 AM LT 3:00 PM LT	Point forecast 3:30 PM CDT	Spot forecast on request	Watch/Warning	Fire district
Duluth	MSPFWFDLH	MSPFWMDLH	phone, web-based MSPFWSDLH	MSPRFDLH	955 956 957
Chanhassen	MSPFWFMPX	MSPFWMMPX	phone, web-based MSPFWSMPX	MSPRFWMPX	961
La Crosse	MKEFWFARX	MKEFWMARX	phone, web-based MKEFWSARX	MKERFWARX	962 963 964
Milwaukee/ Sullivan	MKEFWFMKX	MKEFWMMKX	phone, web-based MKEFWSMKX	MKERFWMKX	965 966 967
Green Bay	MKEFWFGRB	MKEFWMGRB	phone, web-based MKEFWSCRB	MKERFWGRB	958, 959 960 965

Note: The fire weather responsibility of fire weather zone 965 is shared by WFO Milwaukee/Sullivan and WFO Green Bay. WFO Milwaukee/Sullivan has fire weather responsibility for Marquette and Green Lake counties of zone 965, while WFO Green Bay has fire weather responsibility for Waushara County of zone 965.

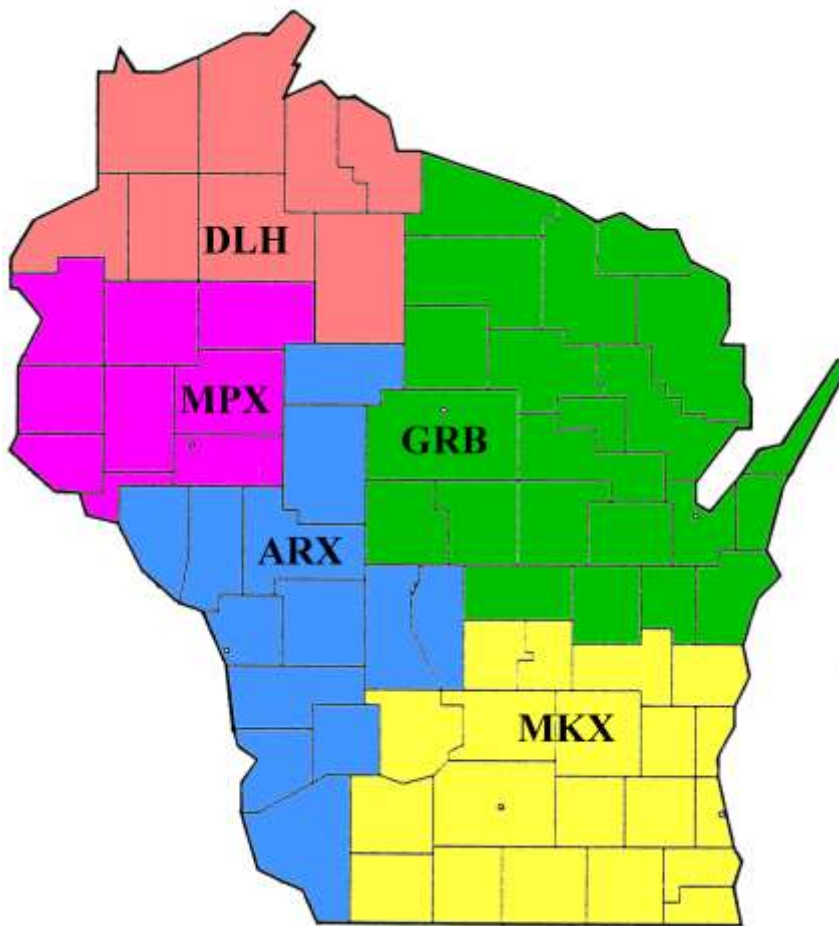
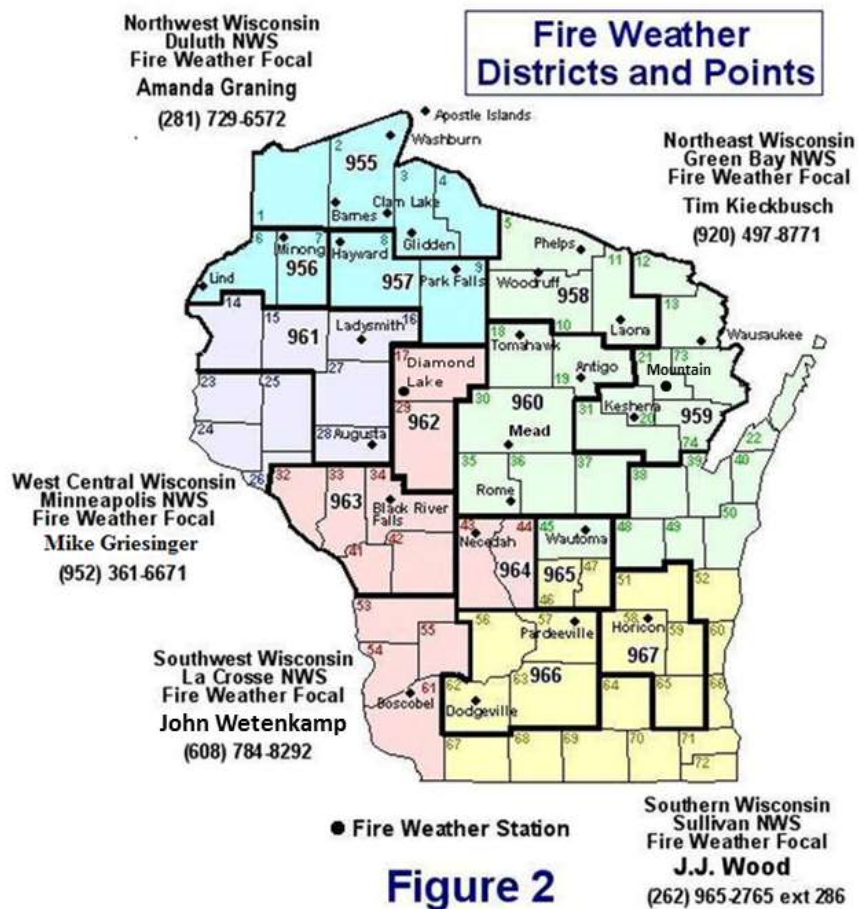


Figure 1. Forecast Areas

Products Issued:

1. Planning Forecasts
2. NFDRS Forecasts
3. Spot Forecasts
4. Fire Weather Watch
5. Red Flag Warning



1. Routine Fire Weather Planning Forecasts

The Fire Weather Planning Forecast is a zone-type product used by land management personnel. It is primarily for input in decision-making related to pre-suppression and other planning. The decisions impact firefighter safety, protection of the public and property, and resource allocation.

The morning and afternoon Fire Weather Planning Forecast (AWIPS/WIMS product **MKEFWFMKX**, **MKEFWFGRB**, **MKEFWFARX**, **MSPFWFMPX** or **MSPFWFDLH**) will be broken down into 74 zones with a zone number assigned to each Wisconsin county (**Figure 2**). Many zones will usually be combined to form one forecast group. The morning and afternoon forecast will be entered into the NWS AWIPS computer system by 700 AM LT and 3-330 PM LT respectively. They are then available to users via WIMS, NWS office web sites, or Predictive Services web sites at the GACCs.

The elements in the narrative forecast are:

Headline (Required for Red Flag Warnings and Fire Weather Watches)

- may also headline other significant weather concerns or changes

Discussion

- written with enough detail to give users knowledge of weather causes during the forecast period. Brief enough to make radio dissemination as efficient as possible
- provides frontal positions, movements and timing
- serves as a vehicle to discuss reasoning for headlines or expected changes in critical parameters such as temperature, humidity, and wind
- **Added for 2016: a note will be used, in this section, to alert for YouTube video briefings, or other special briefings, for the more critical fire weather days**

Sky/Weather

- sky and general weather conditions (Appendix F) including trends
- as specific as possible on timing, duration and coverage of precipitation
- as specific as possible on cloud coverage, type, and trends

High and low temperature

- temperature ranges should be kept as small as possible, 5 degrees or less

Relative humidity

- forecast daytime minimum and nighttime maximum
- humidity ranges of 5 percent when RH is 40 percent or less; a maximum range of 10% can be used for RH greater than 40 percent

20 foot wind speed (mph) and direction

- as specific as possible on timing of significant speed and directional changes
- given in ranges of 5 mph or less and includes gusts
- forecast direction to nearest 8 cardinal compass points (northwest, north, southeast)

Other elements included:

Haines Index

- low level determined from the 950 - 850 MB level (about 1,000 ft to 5,000 ft.)
- attached to “DAY” periods
- provided by all NWS offices year round

Smoke Management parameters

- depth of the mixing layer. The average mixing height from 12 to 18 hours local time.
- attached to “DAY” periods
- transport winds (speed and direction) in the mixing layer dispersion index consisting of a number and a text ranking of poor, fair, good, or excellent (Appendix B explains the terms used in smoke management)
- provided by all NWS offices year round

Hours of sunshine

- important for assessing probability of ignition of fine fuels (strong insolation can make them more likely to ignite)

Precipitation amount

- coverage and expected amount

Extended forecasts

- added after each forecast group providing forecasts for the 3-7 day period .
- included are: sky/weather, temperature, with a wind forecast thru Day 7.

****Optional elements in narrative forecasts may vary slightly between NWS offices**

Examples of the morning and afternoon Fire Weather Planning Forecast are located on pages 13-15. The morning format includes the first three forecast periods, while the afternoon forecast will include an additional 4th period.

Morning Planning Forecast Example:

FNUS53 KMKX 260902
FWFMKX

FIRE WEATHER PLANNING FORECAST FOR SOUTHERN WISCONSIN
NATIONAL WEATHER SERVICE MILWAUKEE/SULLIVAN WI
402 AM CDT MON MAR 26 2012

.DISCUSSION...A COOL DAY LIES AHEAD WITH TEMPERATURES HOLDING CLOSER TO SEASONAL NORMAL FOR LATE MARCH. A FEW SHOWERS ARE EXPECTED THIS MORNING OVER PARTS OF SOUTH CENTRAL WISCONSIN...WITH A SMALL CHANCE LINGERING INTO THE AFTERNOON. WARMER TEMPERATURES AND HIGHER DAY TIME DEWPOINTS WILL RETURN ON TUESDAY.

WIZ066-071-072-270030-
MILWAUKEE-RACINE-KENOSHA-
INCLUDING THE CITIES OF...MILWAUKEE...RACINE...KENOSHA
402 AM CDT MON MAR 26 2012

.TODAY...
SKY/WEATHER.....MOSTLY CLOUDY. ISOLATED RAIN SHOWERS UNTIL
1300. CHANCE OF SHOWERS 20 PERCENT.
MAX TEMPERATURE.....41-46.
MIN HUMIDITY.....36-41 PERCENT.
20-FOOT WINDS.....NORTHEAST WINDS 16 TO 21 MPH.
HAINES INDEX.....4 OR LOW.
HOURS OF SUN.....3 HOURS.
PRECIPITATION.....NONE.
MIXING HEIGHT.....AROUND 2900 FT AGL (AVE 12-6 PM).
TRANSPORT WINDS.....EAST AROUND 15 MPH (AVE 12-6 PM).
SMOKE DISPERSAL.....AROUND 38000 OR GOOD (AVE 12-6 PM).

.TONIGHT...
SKY/WEATHER.....MOSTLY CLOUDY. SLIGHT CHANCE OF SHOWERS AND
THUNDERSTORMS AFTER 0100. CHANCE OF
PRECIPITATION 20 PERCENT.
MIN TEMPERATURE.....32-37.
MAX HUMIDITY.....81-86 PERCENT.
20-FOOT WINDS.....BREEZY. SOUTHEAST WINDS 21 TO 26 MPH WITH GUSTS
TO AROUND 40 MPH.
PRECIPITATION.....ISOLATED TRACE TO 0.05 INCH AMOUNTS.

.TUESDAY...
SKY/WEATHER.....MOSTLY CLOUDY. SLIGHT CHANCE OF SHOWERS AND
THUNDERSTORMS UNTIL 1300...THEN CHANCE OF
SHOWERS AND THUNDERSTORMS. CHANCE OF
PRECIPITATION 40 PERCENT.
MAX TEMPERATURE.....60-65.
MIN HUMIDITY.....39-44 PERCENT.
20-FOOT WINDS.....BREEZY. SOUTH WINDS 22 TO 27 MPH. GUSTS UP TO
40 MPH UNTIL LATE AFTERNOON.
HAINES INDEX.....3 OR VERY LOW.
HOURS OF SUN.....3 HOURS.
PRECIPITATION.....SCATTERED 0.05 TO 0.10 INCH AMOUNTS.
MIXING HEIGHT.....AROUND 2100 FT AGL (AVE 12-6 PM).
TRANSPORT WINDS.....SOUTH AROUND 33 MPH (AVE 12-6 PM).
SMOKE DISPERSAL.....AROUND 62000 OR EXCELLENT (AVE 12-6 PM).

.FORECAST DAYS 3 THROUGH 7...
.TUESDAY NIGHT...MOSTLY CLEAR. SLIGHT CHANCE OF SHOWERS AND
THUNDERSTORMS. LOWS 45 TO 50. SOUTHWEST WINDS 13 TO 18 MPH.
CHANCE OF PRECIPITATION 20 PERCENT.

.WEDNESDAY...PARTLY SUNNY. HIGHS 60 TO 65. WEST WINDS 16 TO 21 MPH WITH GUSTS TO AROUND 30 MPH.
 .WEDNESDAY NIGHT...PARTLY CLOUDY. LOWS 35 TO 40. NORTH WINDS 12 TO 17 MPH.
 .THURSDAY...MOSTLY SUNNY. HIGHS 45 TO 50. NORTHEAST WINDS 5 TO 10 MPH.
 .THURSDAY NIGHT...PARTLY CLOUDY. SLIGHT CHANCE OF SHOWERS AND THUNDERSTORMS. LOWS 35 TO 40. EAST WINDS 5 TO 9 MPH. CHANCE OF PRECIPITATION 20 PERCENT.
 .FRIDAY...PARTLY SUNNY. CHANCE OF SHOWERS AND THUNDERSTORMS. HIGHS 50 TO 55. SOUTHEAST WINDS 5 TO 8 MPH. CHANCE OF PRECIPITATION 40 PERCENT.
 .FRIDAY NIGHT...PARTLY CLOUDY. SLIGHT CHANCE OF SHOWERS AND THUNDERSTORMS. LOWS 40 TO 45. EAST WINDS AROUND 5 MPH. CHANCE OF PRECIPITATION 20 PERCENT.
 .SATURDAY...PARTLY SUNNY. CHANCE OF SHOWERS AND THUNDERSTORMS. HIGHS 50 TO 55. EAST WINDS 5 TO 6 MPH. CHANCE OF PRECIPITATION 30 PERCENT.
 .SATURDAY NIGHT...PARTLY CLOUDY. SLIGHT CHANCE OF SHOWERS AND THUNDERSTORMS. LOWS 40 TO 45. EAST WINDS 5 TO 6 MPH. CHANCE OF PRECIPITATION 20 PERCENT.
 .SUNDAY...PARTLY SUNNY. HIGHS 50 TO 55. EAST WINDS 5 TO 7 MPH.

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. . . (other zone groups and forecasts from the remainder of the NWS office's county area of responsibility).

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The Afternoon Planning Forecast:

The afternoon planning forecast includes the same bulleted weather parameters as the morning planning forecast. The difference is a detailed, bulleted forecast is provided for the first four periods TONIGHT, TOMORROW, TOMORROW NIGHT and the NEXT DAY.

Afternoon Planning Forecast Example:

FNUS53 KMKX 082020
 FWFMKX

FIRE WEATHER PLANNING FORECAST FOR SOUTHERN WISCONSIN
 NATIONAL WEATHER SERVICE MILWAUKEE/SULLIVAN WI
 320 PM CDT TUE MAY 8 2012

.DISCUSSION...AN UPPER LEVEL DISTURBANCE WILL BRING SHOWERS AND ISOLATED THUNDERSTORMS TO THE AREA THROUGH THIS EVENING...TAPERING OFF AFTER MIDNIGHT. LOW CLOUDS EARLY WEDNESDAY WILL SLOWLY SCATTER OUT BY LATE IN THE DAY. HIGH PRESSURE PASSING TO THE SOUTH OF THE REGION THROUGH THURSDAY WILL BRING QUIET WEATHER TO THE AREA. LOW TO MODERATE RELATIVE HUMIDITY VALUES ARE EXPECTED WEDNESDAY AND THURSDAY AFTERNOON...WITH LAKE BREEZES NEAR LAKE MICHIGAN. TEMPERATURES WILL BE NEAR TO SLIGHTLY ABOVE SEASONAL NORMALS.

WIZ046-047-056-057-091215-
 MARQUETTE-GREEN LAKE-SAUK-COLUMBIA-
 INCLUDING THE CITIES OF...MONTELLO...BERLIN...BARABOO...PORTAGE...
 WISCONSIN DELLS
 320 PM CDT TUE MAY 8 2012

.TONIGHT...
 SKY/WEATHER.....MOSTLY CLOUDY. NUMEROUS RAIN SHOWERS AND
 ISOLATED THUNDERSTORMS UNTIL 2200...THEN

SCATTERED RAIN SHOWERS UNTIL 0100...THEN
ISOLATED RAIN SHOWERS. CHANCE OF PRECIPITATION
60 PERCENT.
MIN TEMPERATURE.....41-46.
MAX HUMIDITY.....95-100 PERCENT.
20-FOOT WINDS.....NORTHWEST WINDS 5 TO 9 MPH.
PRECIPITATION.....AREAS OF TRACE TO 0.05 INCH AMOUNTS.

.WEDNESDAY...
SKY/WEATHER.....PARTLY SUNNY.
MAX TEMPERATURE.....60-65.
MIN HUMIDITY.....35-40 PERCENT.
20-FOOT WINDS.....NORTHWEST WINDS 5 TO 10 MPH.
HAINES INDEX.....4 OR LOW.
HOURS OF SUN.....7 HOURS.
PRECIPITATION.....NONE.
MIXING HEIGHT.....AROUND 8600 FT AGL (AVE 12-6 PM).
TRANSPORT WINDS.....NORTH AROUND 17 MPH (AVE 12-6 PM).
SMOKE DISPERSAL.....AROUND 126000 OR EXCELLENT (AVE 12-6 PM).

.WEDNESDAY NIGHT...
SKY/WEATHER.....MOSTLY CLEAR.
MIN TEMPERATURE.....38-43.
MAX HUMIDITY.....95-100 PERCENT.
20-FOOT WINDS.....NORTHWEST WINDS 5 TO 6 MPH EARLY IN THE EVENING
BECOMING LIGHT.
PRECIPITATION.....NONE.

.THURSDAY...
SKY/WEATHER.....MOSTLY SUNNY.
MAX TEMPERATURE.....66-71.
MIN HUMIDITY.....32-37 PERCENT.
20-FOOT WINDS.....SOUTHWEST WINDS 5 TO 8 MPH.
HAINES INDEX.....4 OR LOW.
HOURS OF SUN.....11 HOURS.
PRECIPITATION.....NONE.
MIXING HEIGHT.....AROUND 6800 FT AGL (AVE 12-6 PM).
TRANSPORT WINDS.....WEST AROUND 10 MPH (AVE 12-6 PM).
SMOKE DISPERSAL.....AROUND 60000 OR EXCELLENT (AVE 12-6 PM).

.FORECAST DAYS 3 THROUGH 7...
.THURSDAY NIGHT...MOSTLY CLEAR. LOWS 45 TO 50. SOUTH WINDS AROUND
5 MPH.
.FRIDAY...PARTLY SUNNY. HIGHS 70 TO 75. SOUTHWEST WINDS 7 TO
12 MPH.
.FRIDAY NIGHT...MOSTLY CLOUDY. CHANCE OF RAIN SHOWERS AND SLIGHT
CHANCE OF THUNDERSTORMS. LOWS 50 TO 55. WEST WINDS 5 TO 8 MPH.
CHANCE OF PRECIPITATION 30 PERCENT.
.SATURDAY...PARTLY SUNNY. SLIGHT CHANCE OF RAIN SHOWERS. HIGHS
65 TO 70. NORTH WINDS 5 TO 7 MPH. CHANCE OF SHOWERS 20 PERCENT.
.SATURDAY NIGHT...PARTLY CLOUDY. LOWS 45 TO 50. NORTH WINDS 5 TO
6 MPH.
.SUNDAY...PARTLY SUNNY. HIGHS 65 TO 70. NORTHWEST WINDS AROUND
5 MPH.
.SUNDAY NIGHT...MOSTLY CLEAR. LOWS 45 TO 50. SOUTHWEST WINDS 5 TO
6 MPH.
.MONDAY...PARTLY SUNNY. HIGHS 70 TO 75. WEST WINDS 5 TO 7 MPH.
.MONDAY NIGHT...PARTLY CLOUDY. LOWS 50 TO 55. LIGHT WINDS.
.TUESDAY...PARTLY SUNNY. HIGHS 70 TO 75. LIGHT WINDS.

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(other zone groups and forecasts from the remainder of the NWS office's area).
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Updates to Fire Weather Planning Forecasts

Updates and a reason for an update will be provided whenever forecast conditions become unrepresentative. Fire agencies are also encouraged to call their local NWS office when the forecast is unrepresentative, or the forecasts between NWS offices are sufficiently different at the geographical NWS borders to create uncertainty among the fire weather users. Additionally, updates will be made to the morning or afternoon Fire Weather Planning Forecasts for changes in Red Flag headlines (coordination required) which include:

1. New issuance of a Fire Weather Watch or Red Flag Warning.
2. Upgrading from a Fire Weather Watch to a Red Flag Warning.
3. Change an area outline of a Fire Weather Watch or Red Flag Warning.
4. Cancellation of a Fire Weather Watch or Red Flag Warning.

Also, updates will be made when the following conditions are met during a Fire Weather Watch or Red Flag Warning:

1. Precipitation occurrence or non-occurrence if different from the forecast.
2. Wind speed differs by more than 5 mph.
3. Temperature differs by more than 5 degrees Fahrenheit.
4. Relative Humidity differs by 10% or more.

2. NFDRS point forecasts

A point forecast will be issued for a fire weather user reporting an observation for any given day and must be entered into AWIPS before 3:30 PM CDT/2:30 PM CST (2030 UTC). The point forecasts are then used to calculate output from the National Fire Danger Rating System (NFDRS). The output is used by land management agencies to determine fire danger levels, staffing, and resource needs. NWS forecasters can retrieve this data under the AWIPS identifier **NMCFDICR**. Critical fire danger situations may exist when the energy release component (ERC) is 44 or higher in the q-fuel model (Jack Pine) and/or the 10 hour fuel moisture (10 H) is less than 10%.

Up to 27 point forecasts may be issued on a particular day statewide with high fire danger levels. But during wet periods or after green-up, there is considerably less point forecasts requested with land agencies. During periods of low fire danger, point forecasts may be terminated on weekends. In addition, after green-up in early June, and with the offering of a normal or wetter than normal summer, point and narrative forecasts may be terminated for all days until late summer, or when land agencies feel that point forecasts or narratives are again necessary.

A listing of observations from 1900 UTC is obtained from two separate transmissions at 1930 UTC and 2015 UTC. The transmissions are under the AWIPS identifier **NMCFWOCR**. After the point forecasts are issued, a third transmission of NMCFWOCR, at 2030 UTC, will list the point forecasts for that day. Point forecasts for NFDRS sites can be found under the identifiers MKEFWMMKX, MKEFWMGRB, MKEFWMARX, MSPFWMMPX or MSPFWMDLH. See **figure 2** for the location of NFDRS sites and **Table 2** for the format of the NFDRS forecasts. A catalog of all the NFDRS sites for Wisconsin is located in Appendix F.

Table 2. Fire weather point forecast coding reference

The format is: (commas but NO spaces)		
FCST,SSCCNN,YYMMDD,VT,W,TT,RH,L1,L2,DD,VV,M,TM,TN,HM,HN,P1,P2,WF		
STN # code SSCCNN where SS = State (21 is MN) CC = County NN = station		
SSCCNN - 6 digit station number from above		
YYMMDD - valid day of fcst - year/month/day (The forecast made on April 10, 2007 for the 11th would be 070411)		
VT - Valid time (always a 13 for 1300 CST or 2 pm CDT)		
W - State of the weather at 1300 CST tomorrow, as shown below:		
0	= less than 1/8 clouds	4 = fog
1	= 1/8 to 4/8 opaque clouds	5 = drizzle
2	= 5/8 to 7/8 opaque clouds	6 = rain
3	= cloudy	7 = snow/sleet
		8 = showers
		9 = thunderstorms
<i>(Note: categories 5, 6, or 7 set NFDRS indices to zero)</i>		
TT = temperature for 1300 CST tomorrow		
RH = relative humidity for 1300 CST tomorrow		
* L1 = lightning activity level (1400 CST today until 2300 CST). Always a "1" in Wisconsin		
* L2 = lightning activity level (2300 CST today until 2300 CST tomorrow). Always a "1" in WI.		
DD = wind direction at 1300 CST tomorrow (16 point compass)		
VV = 20 ft wind speed in mph at 1300 CST tomorrow		
M = 10 hr fuel moisture (input by the users and left blank by the forecaster). Two commas will be noted next to each other		
TM = maximum temperature from 1300 CST to 1300 CST		
TN = minimum temperature from 1300 CST to 1300 CST		
HM = maximum humidity in percent from 1300 CST to 1300 CST		
HN = minimum humidity in percent from 1300 CST to 1300 CST		
P1 = pcpn duration in hours from 1300 CST today till 0500 CST tomorrow		
P2 = pcpn duration in hours from 0500 CST tomorrow till 1300 CST tomorrow		
WF = Wet Flag. A Y or N. It is used to indicate if fuels will be wet at 1300 CST. Use with caution, a "Y" will set all NFDRS indices to ZERO! In most cases a "N" is recommended.		

3. Spot forecasts

a) Criteria - Spot forecasts are site specific forecasts in support of wildfire suppression and natural resource management. Spot forecasts for a wildfire will be treated with a priority similar to that of severe weather warnings. It is the responsibility of the requestor to indicate that the request is for wildfire suppression.

By [Interagency Agreement](#) and [NWSI 10-401](#), the NWS will provide spot forecasts to any federal, state, tribal, or local official for support of a wildfire.

For non-wildfire purposes, resources permitting, the NWS will provide spot forecast service under the following circumstances and conditions:

- a. Upon request of any federal official who represents that the spot forecast is required under the terms of the [Interagency Agreement for Meteorological Services](#) and [NWSI 10-401](#).
- b. Upon request of any state, tribal, or local official who represents that the spot forecast is required to carry out their wildland fire management responsibilities in coordination with a federal land management agency participating in the [Interagency Agreement for Meteorological Services](#).
- c. Upon request of any public safety official who represents that the spot forecast is essential to public safety. A “public safety official” is an employee or contract agent of a government agency at any level (federal, state, local tribal, etc.) charged with protecting the public from hazards, including wildland fires of whatever origin and/or other hazards influenced by weather conditions such as hazardous material release.

The NWS will not provide spot forecasts to private citizens or commercial entities not acting as an agent of a government agency.

Requestor Identification - The requestor for each spot forecast must provide the following information before a spot forecast can be issued.

- a. Name
- b. Government agency
- c. Address and phone number
- d. Representation as to the reason for the spot forecast, which must be one of the reasons indicated above.

A current on-site weather observation should accompany the forecast request. The requestor should specify how the wind measurement was obtained (20 foot or eye-level). In the case of a wildfire or prolonged prescribed burn, updated observations should be provided during the course of the event. Land management personnel should contact the servicing NWS office if forecast conditions appear unrepresentative of actual weather conditions. Spot forecasts should be considered one-time requests, and are not routinely updated unless representative observations are available to the forecaster. Feedback from land management personnel is also encouraged during or after the burn.

Users are asked to read the Fire Weather Planning Forecast before making a spot forecast request. To hold the number of spot forecasts to a manageable level, internal coordination and planning should be done by user agencies making forecast requests.

b) Content and Format - The standard format for wildfire spots includes: headlines (Red Flag Warning or Fire Weather Watch) explaining what, when, where and why; discussion, sky/weather, temperature, relative humidity, and wind. Other optional elements may also be provided. See example below.

The content of non-wildfire spots should conform to the standard format for wildfire spots, though the content and number of forecast periods may be different, as determined by the requestor. Users should be as specific as possible when making a forecast request.

To aid in making smoke management decisions, requestors may now request HYSPLIT trajectory data as part of their Spot Forecast request. To obtain this information, simply add to the REMARKS block of the request: Hysplit<space>your e-mail address. An example would be: Hysplit joe.public@governmentagency.gov. The HYSPLIT data will then be e-mailed to the requestor. More detailed information and instructions can be found in Appendix B.

c) Procedures - An Internet-based program, NWS Spot, is the national standard for requesting, issuing, and retrieving spot forecasts. This program is available on NWS web sites. Spot forecasts can also be requested by phone or fax. A phone call must accompany the fax request so the forecaster is aware of the request.

The requesting agency should provide information about the location, topography, fuel type(s), size, ignition time, and a contact and telephone number of the responsible land management official. When possible, a representative weather observation should accompany the request. As indicated above in section 3a, requestor information justifying the spot forecast request must also be provided for the forecast request to be honored.

Feedback to the NWS office providing the spot forecast is highly encouraged.

FNUS73 KMKX 141209
FWSMKX

SPOT FORECAST FOR (NAME OF FIRE)...(REQUESTING AGENCY)
NATIONAL WEATHER SERVICE MILWAUKEE/SULLIVAN WI
709 AM CDT SAT APR 14 2012

FORECAST IS BASED ON IGNITION TIME OF 1200 CDT ON APRIL 14.
IF CONDITIONS BECOME UNREPRESENTATIVE...CONTACT THE NATIONAL WEATHER
SERVICE.

.DISCUSSION...CLOUDS THIS MORNING WILL GIVE WAY TO PARTLY CLOUDY SKIES
AND WARM TEMPERATURES FOR THIS AFTERNOON. LOW RELATIVE HUMIDITY IS EXPECTED.
OCCASIONAL SHOWERS AND THUNDERSTORMS WILL THEN DEVELOP BY LATE EVENING
AS A STRONG WARM FRONT APPROACHES FROM THE SOUTH.

.TODAY...

SKY/WEATHER.....MOSTLY CLOUDY.
MAX TEMPERATURE.....61 AT IGNITION...MAX 72.
MIN HUMIDITY.....62 PERCENT AT IGNITION...MIN 40 PERCENT.
20-FOOT WINDS.....WINDS SOUTHWEST AT 7 MPH AT
IGNITION...OTHERWISE SOUTHWEST WINDS 5 TO 10
MPH.
HAINES INDEX.....5 OR MODERATE AT IGNITION...MAX 6.
SMOKE DISPERSAL....FAIR /27900 KNOT-FT/ AT IGNITION. MAX...GOOD
/59600 KNOT-FT/ INCREASING TO EXCELLENT TO
EXCELLENT (63500-72300 KNOT-FT) LATE IN THE
AFTERNOON.

TIME (CDT)	NOON	2 PM	4 PM	6 PM
SKY (%)	MCLDY	PCLDY	PCLDY	MCLDY
WEATHER COV.....				
WEATHER TYPE....NONE	NONE	NONE	NONE	
TEMP.....61	69	72	71	
RH.....62	47	41	44	
20 FT WIND.....SW 7	SW 8	SW 9	S 8	
20 FT WIND GUST.15	15	20	15	
HAINES INDEX....5	5	6	5	

.TONIGHT...

MIN TEMPERATURE.....MIN 56.
MAX HUMIDITY.....MAX 100 PERCENT.
20-FOOT WINDS.....SOUTH WINDS 6 TO 11 MPH. GUSTY AND ERRATIC
WINDS EXPECTED NEAR THUNDERSTORMS.

TIME (CDT)	7 PM	9 PM	11 PM	1 AM	3 AM	5 AM
TEMP.....69	62	57	56	59	60	
RH.....49	67	90	100	96	93	
20 FT WIND.....S 7	S 5	S 5	S 6	S 9	S 10	
20 FT WIND GUST.15	15	10	15	15	20	

\$\$
FORECASTER... (NAME)
REQUESTED BY... (NAME)
TYPE OF REQUEST...PRESCRIBED (OR WILDFIRE)
.TAG 20120414.OAKFI.01/MKX

Figure 3. Example of a standardized spot weather forecast for a prescribed burn or wildfire.

4. Fire Weather Watches and Red Flag Warnings

NWS offices will issue Fire Weather Watches and Red Flag Warnings when the combination of dry fuels and weather conditions support extreme fire danger. The WDNR and USFS are responsible for keeping the NWS aware of fuel conditions that could lead to extreme fire danger. The NWS will coordinate with these primary user agencies prior to issuing Fire Weather Watches and Red Flag Warnings. See the call list under section 4. C. – Procedures.

User agencies will handle all public and media questions about fire potential and danger. The NWS will answer questions only about weather conditions, and will not comment on fire conditions.

The issuance of these products is typically a two-stage process.

A. Fire Weather Watch

A Fire Weather Watch is issued when there is a reasonable level of confidence for the development of a red flag event. A watch will be issued 18 to 72 hours in advance of the expected onset of criteria. Red flag criteria are listed below. All four of the following weather conditions, including the dryness of the fuels, should be met for a watch to be issued. These criteria are subjective guidelines, so watches and warnings may be issued by the NWS offices for lesser criteria, assuming the WDNR and the USFS agree that critical fire weather conditions will occur. See the highlighted text on the next page:

1. Sustained ten-minute winds at the 20 foot level are at or above 15 mph.
2. Minimum relative humidity at or less than 25 percent.
3. Temperatures at or greater than 75 degrees F.
4. The dryness of the fuels will be determined by analyzing the Fine Fuel Moisture Code (FFMC) of the Canadian Forest Fire Danger Rating System (CFFDRS). Fire season 2016 will be another year in using FFMC. When the FFMC reaches 92, this will be the trigger point for agencies to collaborate to determine if a Red Flag should be issued. A FFMC of 94 or higher has been identified as the predictable level that would commonly represent a Red Flag warning.

NOTE: Basic fuels thresholds for use during summertime (after green-up) Red Flag events have been determined. The CFFDRS Build-Up Index (BUI) has shown the best correlation with summertime fuels and fires. Similar to the ERC, two fuel thresholds will be used: One that will be used to determine if Red Flag coordination needs to occur, and another that represents critically dry conditions. These may be changed in the future, if the WDNR and USFS feel that these values are not representative.

CFFDRS BUI of 100+ = Coordination guideline (if values are less than 100, fuels are probably too moist for a summertime project fire).

CFFDRS BUI of 110+ = Fuels are critically dry and conducive to project fires.

Other factors which may be considered if any of the above are marginal:

- A dry slot will affect the area.
- NFDRS Energy Release Component (ERC) of 44 or higher in Q-fuel model.
- NFDRS values are in the high to extreme categories.
- The surface dew point depression (best indicator of high fire danger) is more than 40 F.
- The 850 mb dew point depression is greater than 18F (10C).
- It is before spring green-up (usually by June 1st).
- It is after the fall color change or a killing frost.
- The area has been in a dry spell for a week or more.
- Dry lightning is anticipated (rare, except during periods of drought).
- **Added for 2016: Frequent wind gusts in excess of 25 mph are expected.**
- **Adjusted for 2016: Gusty winds in excess of 35 mph (low end threshold), or in excess of 45 mph (high end threshold), are expected. This can result in trees falling on power lines, causing power lines to break and sparking fires.**
- 10-hour fuel moisture is less than 10%.
- Extreme behavior on prescribed burns in the area the past several days.
- Haines Index values are in the moderate to high category (5 or 6).

The most common red flag or near red flag synoptic weather situations:

- Strong low pressure moving from the north or central U.S. Rockies to Lake Superior, or a strong Alberta Low tracking to near Lake Superior. Both situations require a windy dry slot associated with a low level jet.
- A departing Hudson Bay High Pressure replaced by the strong low pressure scenario. The high pressure area provides Wisconsin with dry easterly winds and subsiding air. This will effectively dry out the fuels.

Fire Weather Watch coordination and issuance:

- NWS offices will coordinate the issuance, change, and cancellation of Fire Weather Watches with the WDNR and USFS.
- All NWS offices will coordinate weather conditions internally via chat software or telephone. If critical weather conditions are expected, **one** NWS contact person will contact the WDNR and the USFS via telephone for fuel conditions using the phone list provided herein.
- If fuel coordination between the WDNR and USFS has not taken place prior to this call, a **collaboration period** before the official “go-ahead” to issue a watch will be granted. During this period, the WDNR and USFS will coordinate fuel conditions, and the overall need for a watch. A spokesperson from the WDNR or USFS will call the NWS contact person to relay their decision.
- **Added for 2016: There will be 5 AM (morning) and 2 PM (afternoon) fuel and headline coordination deadlines for Fire Weather Watch and Red Flag Warning situations. Initial phone calls to Jim Barnier (WDNR) and Jim Grant (USFS) need to occur by 3 AM (morning) and 12 PM (afternoon). Heads-up e-mail messages should be sent by NWS offices to user agencies as early as possible (hopefully a couple of days in advance), alerting to the possibility of upcoming Fire Weather Watch and Red Flag Warning conditions. This will facilitate earlier fuel coordination. In addition, the “10-15 minute” collaboration period wording in the paragraph above was removed. It now just states, “collaboration period.”**
- The NWS contact person shall be responsible for disseminating this information back to the other affected NWS offices via chat software or telephone.
- During situations of borderline criteria (no Fire Weather Watch/Red Flag Warning in effect), the NWS and land management agencies have agreed to use “near-critical” or “elevated” wording when describing fire weather conditions in their respective public information products. Land management agencies may use other wording in these

situations, provided the NWS is not mentioned in their public information products.

- During situations when Fire Weather Watches or Red Flag Warnings are in effect, the NWS and land management agencies have agreed to use “severe”, “critical” or “extreme” wording when describing fire weather conditions in their respective public information products.

- To avoid confusion, the term “red flag” will only be used in a Red Flag Warning. A Fire Weather Watch **will be** disseminated on NOAA All Hazards Radio.

- A Fire Weather Watch will be headlined in the Fire Weather Planning Forecast. The headline will include what, when, where and why. Headlines belong before the discussion and before each zone grouping of the Fire Weather Planning Forecast.

- If issued, a Fire Weather Watch (RFW) will describe the affected area, valid time of the watch, and reasons for the watch. A RFW shall have a UGC coding line followed by a Valid Time Event Code (VTEC). Identifiers for each office are MKERFWMKX, MKERFWGRB, MKERFWARX, MSPRFWMPX AND MSPRFWDLH.

B. Red Flag Warnings

A Red Flag Warning is issued when there is a high probability that all four weather criteria listed under the Fire Weather Watch section of this plan are imminent or will be met within 24 hours. However, a Red Flag Warning can be issued any time at the request of fire management personnel during times of critically dry fuels.

The WDNR and the USFS will monitor the FFMC to help them determine the dryness of the fuels before green-up. The Canadian Forest Fire Danger Rating System (CFFDRS) Build-Up Index (BUI) will be used during the summertime (after green-up) period. A Red Flag Warning will be issued immediately when red flag conditions are occurring, but will be coordinated prior to issuance with WDNR and USFS. The NWS may also monitor the NFDRS and CFFDRS values by going to the WDNR or Eastern Area Coordination Center (EACC) Internet sites. These sites will help the NWS monitor the dryness of the fuels in the state.

Red Flag Warning coordination and issuance:

- NWS offices will coordinate the issuance, change and cancellation for Red Flag Warnings with the WDNR and USFS. If **no** Fire Weather Watch is in effect, full coordination of fuels with the WDNR and USFS must be made prior to the issuance of a Red Flag Warning (using the same procedure as described above for the watch process). If the WDNR and USFS observe wet fuels and do not believe a warning should be issued,

then do not issue the warning. If the NWS is not able to contact any of the officials listed below, then they **shall not** issue the Red Flag Warning.

- If a Fire Weather Watch has already been issued for the affected area (i.e. fuel coordination has already taken place), and if forecast offices agree that critical fire weather conditions will be met, a Red Flag Warning can be issued **without any additional coordination** with the fire management agencies (i.e. WDNR and USFS).

- For **high confidence** Red Flag Warning events, the Red Flag Warning may be issued **the afternoon before** instead of the morning of the event. This would allow extra lead time for the fire management agencies to plan for these events.

- Any Red Flag Warning issuance requires a call or fax to Laura McIntyre-Kelly at the Eastern Area Coordination Center in Milwaukee, Wisconsin:

Main Office Phone: 414-944-3811 Fax: 414-944-3838

- A Red Flag Warning **will be** disseminated on NOAA All Hazards Radio and also NAWAS.

- A Red Flag Warning will be headlined in the routine Fire Weather Planning Forecast (FWF). The headline will include what, when, where and why. Headlines belong before the discussion and before each zone grouping of the Fire Weather Planning Forecast.

- If issued, a Red Flag Warning (RFW) will describe the affected area, valid time of the warning, and reasons for warning. A RFW shall have a UGC coding line followed by a Valid Time Event Code (VTEC). Identifiers for each office are MKERFWMKX, MKERFWGRB, MKERFWARX, MSPRFWMPX AND MSPRFWDLH.

Cancellation of Fire Weather Watches and Red Flag Warnings:

When conditions warrant that a Fire Weather Watch or Red Flag Warning is no longer needed, it should be cancelled by the NWS as soon as possible. **Note: A cancellation statement is not needed if upgrading from a watch to a warning, or for a Red Flag Warning that is being allowed to expire.**

- The cancellation will be coordinated with the users.
- The cancellation will be headlined in the Fire Weather Planning Forecast.
- A cancellation statement under the RFW message shall be issued. A RFW shall have a UGC coding line followed by a Valid Time Event Code (VTEC).

Updates to fire weather planning forecasts when red flag conditions are present:

Updates will be made to the morning or afternoon forecasts for changes in Red Flag headlines (coordination required with land management agencies) which include:

- New issuance of a Fire Weather Watch or Red Flag Warning.
- Upgrading from a Fire Weather Watch to a Red Flag Warning.
- Change an area outline of a Fire Weather Watch or Red Flag Warning.
- Cancellation of a Fire Weather Watch or Red Flag Warning.

In addition, updates will be made when the following conditions are met when a Fire Weather Watch or Red Flag Warning has been issued:

- Precipitation occurrence or non-occurrence if different from the forecast.
- Wind speed differs by more than 5 mph from the forecast.
- Temperature differs by more than 5 degrees Fahrenheit from the forecast.
- Relative Humidity differs by 5 % or more from the forecast.

C. Procedures for calling the WDNR and USFS during potential RFW situations.

Outlook Period (More than 48 hours prior to event):

- The NWS will attempt to provide fire control agencies (i.e. WDNR, USFS, etc.) a “heads-up” of potentially critical fire weather conditions several days in advance if possible. Initial communication may occur via email, during the weekly fire weather conference call, or a courtesy call to the land management agencies.

Watch Period (18 - 72 hours prior to event):

- After coordinating weather conditions via chat software or telephone, **one** NWS contact person will contact the WDNR and the USFS via telephone using the phone list provided below. The WDNR and USFS will coordinate fuel conditions, and the overall need for a watch. A spokesperson from the WDNR or USFS will call the NWS contact person to relay their decision. The NWS contact person shall be responsible for disseminating this information back to the other affected NWS offices via chat software or telephone. If the NWS is not able to contact any of the officials listed below, then they shall not issue the Fire Weather Watch.

Warning Period (less than 24 hours prior to the event):

- If no Fire Weather Watch is in effect, full coordination of fuels with the WDNR and USFS must be made prior to the issuance of a Red Flag Warning (same procedure as described above for the watch process). If the NWS is not able to contact any of the officials listed below, then they shall not issue the Red Flag Warning.

- If a Fire Weather Watch has already been issued for affected areas (i.e. fuel coordination has already taken place), and the NWS forecast offices agree that critical fire weather conditions will be met, a Red Flag Warning can be issued without any additional coordination with the WDNR and USFS.

1. First call made to WDNR

Jim Barnier
Office Phone - (608) 253-6714
Cell Phone - (608) 547-1519

3. Third call made to WDNR

Trent Marty
Office Phone – (608) 266-7978
Cell Phone – (608) 575-8578

2. Second call made to USFS

Steve Radaj
Cell Phone – (715) 493-6934

2. Second call made to WDNR

Mike Warnke
Office Phone - (608) 264-6044
Cell Phone – (715) 213-1632

1. First call made to USFS

Jim Grant
Office Phone – (715) 362-1341
Cell Phone – (715) 493-9137
Home Phone – (715) 362-2319

1. Call to EACC as alternate to WDNR and/or USFS

Stephen Marien
Office Phone –
(651) 293-8446
Cell Phone – (402) 250-7844
Fax – (651) 290-3815

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WWUS83 KMKX 202030
RFBWKKX

URGENT - FIRE WEATHER MESSAGE
NATIONAL WEATHER SERVICE MILWAUKEE/SULLIVAN WI
330 PM CDT TUE MAR 20 2012

...CRITICAL FIRE WEATHER CONDITIONS EXPECTED WEDNESDAY AFTERNOON...

.A STRONG WARM FRONT WILL MOVE NORTH THROUGH THE AREA WEDNESDAY MORNING. GUSTY SOUTHWEST
WINDS BEHIND THE FRONT DURING THE AFTERNOON WILL COMBINE WITH VERY WARM TEMPERATURES AND LOW
RELATIVE HUMIDITY VALUES TO BRING CRITICAL FIRE WEATHER CONDITIONS TO LOCATIONS MAINLY
NORTHWEST OF MADISON.

WIZ046-047-056-057-220000-
/O.NEW.KMKX.FW.W.0001.120321T1800Z-120322T0000Z/
MARQUETTE-GREEN LAKE-SAUK-COLUMBIA-
330 PM CDT TUE MAR 20 2012

...RED FLAG WARNING IN EFFECT FROM NOON TO 6 PM CDT WEDNESDAY FOR VERY WARM
TEMPERATURES...GUSTY SOUTHWEST WINDS AND LOW RELATIVE HUMIDITY VALUES FOR MARQUETTE...GREEN
LAKE...SAUK AND COLUMBIA COUNTIES...

THE NATIONAL WEATHER SERVICE IN MILWAUKEE/SULLIVAN HAS ISSUED A RED FLAG WARNING FOR VERY
WARM TEMPERATURES...GUSTY SOUTHWEST WINDS AND LOW RELATIVE HUMIDITY VALUES...WHICH IS IN
EFFECT FROM NOON TO 6 PM CST WEDNESDAY.

* AFFECTED AREA...MARQUETTE...GREEN LAKE...SAUK AND COLUMBIA COUNTIES.

* TIMING...NOON UNTIL 6 PM CST WEDNESDAY.

* WINDS...SOUTHWEST 15 TO 25 MPH...WITH GUSTS TO 35 MPH.

* RELATIVE HUMIDITY...20 TO 25 PERCENT.

* TEMPERATURES...75 TO 80 DEGREES.

* IMPACTS...THESE CONDITIONS WILL BRING CRITICAL FIRE WEATHER CONDITIONS TO THESE AREAS
WEDNESDAY AFTERNOON.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A RED FLAG WARNING MEANS THAT CRITICAL FIRE WEATHER CONDITIONS ARE EITHER OCCURRING NOW...OR
WILL SHORTLY. A COMBINATION OF STRONG WINDS...LOW RELATIVE HUMIDITY...AND WARM TEMPERATURES
WILL CREATE CRITICAL FIRE WEATHER CONDITIONS.

&&

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Figure 4. Example of a Bulleted Red Flag Warning. Fire Weather Watches would follow the same format. The exact content of the bullets and call to action statements may vary slightly from office to office.

NOTE: DO NOT USE THE PHRASE “RED FLAG” IN A FIRE WEATHER WATCH PRODUCT. INSTEAD, USE PHRASES SUCH AS “CRITICAL FIRE WEATHER CONDITIONS” OR “EXTREME FIRE WEATHER CONDITIONS” TO DESCRIBE THE SITUATION.

5. Verification and Participation in Interagency Groups

a) Verification

Fire weather program leaders will verify the red flag program. Results will be distributed to the NWS regional fire weather program managers as well as the appropriate State and Federal user groups in Wisconsin. Red Flag Warnings will be verified based on the Probability of Detection, False Alarm Rate, Critical Success Index, and Lead Time.

b) Participation in Interagency Groups

NWS offices providing fire weather services for Wisconsin are expected to participate in the annual state fire meeting. This meeting serves as a forum for interaction between NWS program leaders and their interagency users. It also provides an effective vehicle for discussions pertaining to changes to the Annual Operating Plan.

6. Special Services

FIRE WEATHER ON-SITE SUPPORT (IMET) - [NWSI 10-402](#)

a) INCIDENT SUPPORT

On-site forecast service is available from NWS offices with designated Incident Meteorologists (IMETs). A certified Type 1 IMET, Amanda Graning, is on staff at the NWS Duluth, Minnesota (DLH) office. Her contact information is listed below:

Office Phone: 218-729-0653

Cell Phone: 218-213-8089

- Only certified Type 1 IMETs may be dispatched to support on-site service for fire. The NWS is responsible for maintaining proficiency of designated IMETs.
- Request and dispatch of IMETs and equipment is accomplished through the National Resource Coordination System. See [NWSI 10-402](#) for contact information.

In addition to wildfires, IMETs may be dispatched to support:

- Critical resource value prescribed burns.
- Land management coordination and dispatch centers.
- Hazardous substance release.
- Any special projects or incidents, which fall under the mandate of the NWS.

For more details and reimbursable information, refer to NWS Instruction 10-402:

<http://www.nws.noaa.gov/directives/sym/pd01004002curr.pdf>

NWS IMET Google Site: <https://sites.google.com/a/noaa.gov/imet/?pli=1>

By [Interagency Agreement](#), the NWS will support land management agencies with on-site meteorological support to wildland fires upon request through the Type 1 IMET program. Other events listed above may be supported if resources permit. Such uses will be limited to requests of federal fire agencies participating in the Interagency Agreement and requests by public safety officials who represent such requests as essential to public safety.

7. Training

a) Forecaster training - NWS forecasters producing fire weather forecasts shall be trained. Forecasters must fulfill the following requirements as set forth in [NWSI 10-405](#):

- Complete the National Wildfire Coordinating Group's course S-290 ("Intermediate Wildland Fire Behavior").
- Complete courses IS-100.b ("Introduction to the Incident Command System (ICS), ICS-100) and IS-700.a ("National Incident Management System (NIMS), An Introduction") from the Federal Emergency Management Agency (FEMA).
- Local training generally consists of review of the Wisconsin Fire Weather Annual Operating Plan, other local station instructions, as well as training established by the Fire Weather Program Leader.
- Forecasters must also be familiar with all NWS fire weather products and services, and become proficient in the preparation and dissemination of these products.

b) IMET Training and Certification requirements:

IMET CERTIFICATION AND RECERTIFICATION - NWSI [10-402](#) and [10-405](#)

The NWS Office of Climate, Water, and Weather Services, through the National Fire Weather Operations Coordinator (NFWOC) and the Regional Headquarters, will ensure IMETs are properly trained and certified to work within an ICS. The NFWOC and Regional Fire Weather Program Managers will ensure IMET meteorological support equipment familiarization is scheduled annually and designated IMETs in their regions remain certified.

See [NWSI 10-402](#), section 1.4, and [NWSI 10-405](#), sections 4, 5 and 6, for certification and re-certification requirements for Type 1 and Type 2 IMETs.

c) NWS provided training to land management agencies - when NWS staff provides training to land management personnel, costs above planned salary and operating costs may be borne by the benefiting agency(s). See the following guidelines for NWS Instructors Teaching Interagency courses from Appendix A of [NWSI 10-403](#):

NWSI 10-403 Appendix A – Guidelines for Teaching Interagency Courses

1) The request for a NWS instructor for fire agency courses comes through the requesting agency. As with any other non-emergency, out-of-office training assignment, sufficient lead time of several months is needed for scheduling purposes and the request is coordinated through the local WFO's MIC. If the office or Region supplying the NWS instructor expects or requires reimbursement, several options are available in gaining reimbursement.

- a) The preferred method for Federal training assignments is requesting an invitational travel order from the requesting Agency. Invitational travel requires the traveler to fill out a travel voucher in the format required by the requesting Agency. When possible, accommodation, flights and/or other expenses may be paid by the requesting Agency in advance.
- b) If an invitational travel order is not possible, an Agreement can be established with the land management unit paying for the training. For the United States Forest Service (USFS), this Agreement is usually established using the United States Department of Agriculture (USDA) AD-672 form. For the Department of Interior, the requesting Agency supplies an Interagency Agreement (IAA) in the local unit's appropriate format. Once the requesting agency initiates and completes their official request form or IAA for training, it is the responsibility of the requested NWS instructor's Region to complete and establish coding for reimbursement. It is important to note that the Interagency National Agreement for Fire Weather Services does not provide the legal or financial exchange mechanism to execute training. More detailed instruction on training agreements, including sample templates, are available either on the IMET Reimbursable Expense Report (RER) instructions or within the National AOP (both found in the "Admin" section of the national fire weather webpage <http://www.weather.gov/fire>).

In addition, a Gifts and Bequests process can be completed, utilizing guidance found in NOAA's Personal Properties Policies, Chapter 4; sections 4-08 and 4-09. This procedure applies only for travel requested by a Federal source. Non-Federal travel is governed by the Federal Travel Regulations, 41 CFR Part 304.

The website governing Gifts and Bequests can be found here:

http://www.pps.noaa.gov/personal_property_policies_procedures/Gifts_and_Bequests_to_NOAA.pdf

This process requires preparation of a CD-210 form, record of Gift or Bequest. If the amount requested is over \$500, advance approval from NOAA CFO is required.

2) The course should have a local, state, or federal land management instructor paid by that agency to team teach with the NWS instructor. The co-instructor cannot be from a private vendor or academic institution.

If 1 and 2 above are satisfied, then an instructor can be provided with all overtime and travel costs borne by the requesting agency once an AD-673 or IAA is completed. If 1 and 2 cannot be satisfied or it is unclear whether a local, state, or federal land management instructor has been provided, then follow step 3 below.

3) The following questions are asked by the WFO to determine whether an NWS instructor can be approved for the course in question:

a) Is the NWS instructor unique or can this course be taught by anyone else? Are other fire weather instructors (non-NWS) ready, willing and able to teach the course? Contact the Geographic Area Predictive Services meteorologist(s) for information concerning the availability of non-NWS fire weather instructors.

b) If it is determined through coordination with the Geographic Area Predictive Services meteorologist(s) that non-NWS instructors are not ready, willing and able to teach the course, can the NWS be reimbursed for overtime and travel costs?

If it is determined by answers to questions 3a and 3b that an NWS instructor is appropriate and can be reimbursed, then the NWS instructor may teach the course.

IV. WILDLAND FIRE AGENCY SERVICES AND RESPONSIBILITIES

A. OPERATIONAL SUPPORT AND PREDICTIVE SERVICES - the Eastern Area Fire Weather Program Manager/meteorologist (currently Steve Marien), working remotely for the EACC in St. Paul, Minnesota, combines forecast information from NWS offices and other sources into area-wide summaries and briefings. This meteorologist, along with Fire Intelligence, forms the Predictive Services group which produces fire weather/fire danger assessments for Wisconsin. These value added products enhance short and long range forecasts issued by the NWS to assist land managers in allocating fire-fighting resources. Products issued by the EACC are available online at:

http://gacc.nifc.gov/eacc/predictive_services/outlooks/outlooks.htm

Stephen Marien Mailing Address:

EACC Physical Address:

Eastern Area Coordination Center
Mississippi National River and
Recreation Area
111 East Kellogg Boulevard, Suite 105
St. Paul, MN 55101

Eastern Area Coordination Center
626 East Wisconsin Avenue, Suite 500
Milwaukee, WI 53202

B. AGENCY COMPUTER SYSTEMS - The communication system used to link the NWS with its users is the Weather Information and Management System (WIMS). The NWS receives user agency observations entered into WIMS via its AWIPS computer system. Point and narrative forecasts are also sent to WIMS via this system. Observations and forecasts are exchanged between WIMS and AWIPS in the USFS Kansas City Computer Center.

C. FIRE WEATHER OBSERVATIONS - All fire weather observations in Wisconsin are from automated sites and all have GOES antennas installed for data transmission. Station inspection and instrument maintenance are the responsibility of land management agencies. NWS forecasters may monitor data quality from observation sites. Any NWS travel expenses for equipment maintenance or station visitation will be reimbursed by the Wildland Fire Agency making the request.

The following steps are procedures for implementing a new RAWS:

- 1) The federal land management agencies (USFS, NPS, USFWS, BLM, BIA, etc.) and the state agencies (Dept of Natural Resources (DNR) and a few misc. personnel (Nature Conservatory, etc.) begin the process by deciding to install a RAWS. Land management agencies sometimes request input from NWS personnel as to siting criteria. NWS offices are required (by the Interagency Agreement) to provide it if requested from the land management agencies. Also, notify Chris Foltz at Central Region Headquarters and keep him informed throughout the process of RAWS implementation.
- 2) Land management agencies will request a 6-digit code/ID for the new RAWS station. NWS personnel shall forward the request for a new 6-digit ID to the Regional Fire Weather Program Manager (currently Chris Foltz).
- 3) The Regional Fire Weather Program Manager will coordinate with the NWS office involved, the appropriate land management personnel, and the WIMS personnel to determine an identification number.
- 4) Once a 6-digit ID number is coordinated/determined, the Regional Fire Weather Program Manager will provide it to the requestor, and cc: the NWS office and the appropriate USFS personnel.
- 5) It is the responsibility of the requestor/land management person to notify WIMS in order

for the observations to be received/sent from the WIMS.

D. REIMBURSEMENT FOR NWS PROVIDED ON-SITE SUPPORT AND

TRAINING -- Agencies will reimburse the NWS for all costs incurred for IMET support as well as for training assistance or station visitation. Procedures are detailed in the [Interagency National Agreement](#).

V. JOINT RESPONSIBILITIES

- A.** Meteorological training can be provided either by NWS or the EACC meteorologist. Each NWS office has a Fire Weather Program Leader, who is qualified to teach courses up through Intermediate Fire Behavior (S-290). Requests for NWS training should be directed to that office's Fire Weather Program Leader or MIC. Sufficient advance notice should be given to allow for preparation as well as scheduling. Costs incurred by the NWS will be reimbursed by the requesting agency.
- B.** NWS Fire Weather Program Leaders or other NWS forecasters will participate in coordination conference calls, primarily in the spring fire season. This duty will be shared by the program leaders. The NWS representative should be prepared to provide a statewide briefing highlighting significant weather trends as well as possible critical fire weather situations.

VI. EFFECTIVE DATES ON THE AOP

This document will be effective approximately from March 15, 2016 to March 15, 2017.

VII. AGENCY SIGNATURES

Steven Eddy, Acting MIC NWS Milwaukee/Sullivan
Signing for all NWS offices representing Wisconsin

Date

Paul DeLong, Chief State Forester
Signing for the WDNR

Date

Chequamegon-Nicolet NF, Paul Strong, Forest Supervisor
Signing for the USDA Forest Service

Date

Dan Laber, Zone Fire Management Officer
Signing for USFWS

Date

VIII. APPENDICES

- A. Haines Index
- B. Smoke Management/HYSPLIT Requests
- C. Address and Phone Directory
- D. FTS Stations
- E. NFDRS RAWS Site Catalog and Contact list
- F. Precipitation and sky terminology and NOAA All Hazards Radio
- G. Interagency Agreement for Meteorological Services

APPENDIX A

HAINES INDEX

What is the Haines Index?

The Haines Index combines the effects of dry air and instability to determine the potential for large fire growth. Its purpose is to identify weather conditions that may allow an existing fire to spread rapidly or exhibit extreme fire behavior. It should NOT be used to predict the potential or probability for wildfires to ignite. No such danger or wording will be conveyed in any NWS products. The Haines Index is most applicable to plume-dominated fires. The Haines Index does not account for wind.

The Haines Index contains two components, one to assess the dry air, and the other to measure the instability. Dry air affects fire behavior by lowering fuel moisture, which increases the amount of fuel available to the fire and enhances the probability of spotting. Instability is caused by warming the lower levels of the atmosphere, cooling the higher levels, or by a combination of the two processes. An unstable air mass promotes the formation of rising currents of air and thus increases the vertical extent of a smoke column. Wildfires that burn in a dry, unstable environment can become plume-dominated and are often able to generate their own strong surface winds. Ground elevation will determine which of three levels in the atmosphere will be used to compute the Haines Index. In Wisconsin, the low-level layer between 950 mb and 850 mb will be used.

Computing the Haines Index

Haines Index = Stability + Moisture = A + B

Stability Term = 950 MB Temperature - 850 MB Temperature

Let A equal the following values according to the temperature differences

A = 1 when stability term is 3 degrees C or less

A = 2 when stability term is 4 to 7 degrees C

A = 3 when stability term is 8 degrees C or more

Large positive values of the stability term indicate an unstable layer of the atmosphere near the earth's surface. Negative values indicate a temperature inversion.

Moisture Term = 850 MB Temperature - 850 MB Dew Point Temperature

B = 1 when moisture term is 5 degrees C or less

B = 2 when moisture term is 6 to 9 degrees C

B = 3 when moisture term is 10 degrees C or more

The value of the moisture term will always be positive. The greater the value of this term, the drier the air is.

Significance of the Haines Index values

2 or 3 Very Low (moist, stable air)

4 Low

5 Moderate

6 High (dry, unstable air)

An example calculation

950 MB Temperature = 27 degrees C

850 MB Temperature = 18 degrees C

850 MB Dew Point = 14 degrees C

Haines Index = Stability (A) + Moisture (B)

From the tables above

950 MB Temp - 850 MB Temp = 27-18 = 9 A Stability term of 9, so let A = 3.

850 MB Temp - 850 MB Dew point = 18 - 14 = 4 A Moisture term of 4, so let B = 1.

A + B = 3 + 1 = 4.

An Index value of 4 corresponds to a "Low" category. The conclusion is that extreme fire behavior would not be expected on this day.

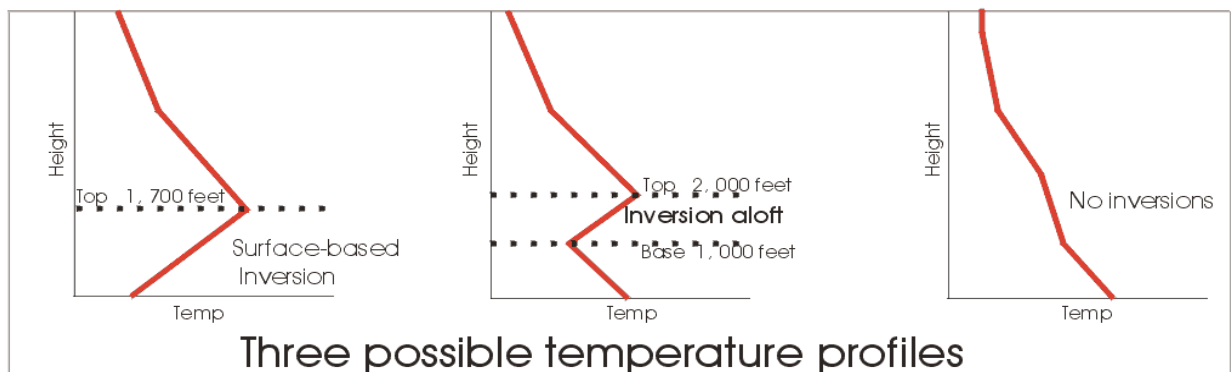
APPENDIX B

SMOKE MANAGEMENT/HYSPLIT REQUESTS

The Clean Air Act requires land management agencies to address the issue of smoke management in its prescribed burns. The goal is to burn in atmospheric conditions that would encourage smoke to rise to such a level that the smoke is dispersed as much as possible to reduce a number of health and safety risks near the fire.

The National Weather Service will support the smoke management efforts of federal, state, and local agencies as well as organizations involved in such burning. **The NWS will provide the mixing height, transport wind and dispersion index year round in the “daytime” portions of the fire weather planning forecast. These values will represent the average values from noon to 6 pm.** The NWS will also include the mixing height, transport wind and dispersion index, upon request of the land agency, in spot forecasts.

The three weather parameters of smoke management forecasts are mixing layer (or height), transport winds, and dispersion index. For smoke management purposes, the mixing layer is usually considered the lowest layers of the atmosphere bounded by the earth’s surface and the bottom of any temperature inversion which may exist aloft. If a temperature inversion is based at the surface, then there is no mixing layer. A temperature inversion would serve to trap smoke at low levels, or would prevent sufficient lofting of smoke to a level where winds would dilute or transport it away from the area. See the figure below:



Three upper air temperature profiles which affect smoke dispersal differently. a) a surface-based inversion is an absolutely stable condition that traps smoke and prevents lofting. b) An elevated inversion is unstable or neutral and allows limited smoke rise, but the smoke will stop rising at the base of the inversion aloft. c) When no inversions are present, smoke is free to rise. However, the existing (ambient) lapse rate will determine the rate of rise and

the plume characteristics.

The transport wind (knots) is defined as the average wind speed and direction through the mixing layer. The transport wind may suggest the need for surveillance or resource location at downstream areas for the purpose of minimizing the danger posed by spotting due to firebrands and to determine the impacts of smoke on a sensitive area.

The Dispersion Index is intended to serve as a single adjective index which describes how smoke will disperse on that day. The Dispersion Rate is given by the following formula:

$$\text{Dispersion Rate} = (\text{Mixing Height in feet}) \times (\text{Transport Wind in knots})$$

The Minnesota Smoke Management Plan (SMP) suggests the following interpretation of the values:

Dispersion Index	Dispersion Rate
< 13,000	Poor
13,000 - 29,999	Fair
30,000 - 59,999	Good
60,000 or greater	Excellent

These values are also applicable in Wisconsin.

The SMP contains guidelines for using the index and should be consulted for those details. Most smoke management inputs to software programs and nomograms are in metric units. A table for conversion among various units is provided on the next page.

Smoke management models require input of parameters in metric units. The National Weather Service uses a variety of units of measure for wind and height. To minimize confusion and to make the conversion of units easier, the following conversion factors will prove helpful.

Multiply	By	To get
Feet	0.308	Meters
Feet	0.0152	Chains
Statute Miles	1609.34	Meters
Statute Miles	1.60934	Kilometers
Statute Miles	0.8684	Nautical Miles
Statute Miles	80	Chains
Nautical Miles	0.6080	Feet
Nautical Miles	1.152	Statute Miles
Nautical Miles	1853.25	Meters
Nautical Miles	1.85325	Kilometers
Chains	66	Feet
Chains	20.12	Meters
Chains	0.0125	Statute Miles
Meters	3.281	Feet

Meters	0.0497	Chains
Meters	0.00062	Statute Miles
Meters	0.00054	Nautical Miles
Kilometers	3280.84	Feet
Kilometers	0.6214	Statute Miles
Kilometers	0.5396	Nautical Miles
Knots	1	Nautical Miles Per Hour
Knots	1.152	Statute MPH
Knots	1.689	Feet Per Second
Knots	0.515	Meters Per Second
Knots	1.853	Kilometers Per Hour
Statute MPH	0.868	Knots
Statute MPH	1.467	Feet Per Second
Statute MPH	0.447	Meters Per Second
Statute MPH	1.609	Kilometers Per Hour
Statute MPH	88	Feet Per Minute
Kilometers Per Hour	0.278	Meters Per Second
Kilometers Per Hour	0.540	Knots
Kilometers Per Hour	0.621	Miles Per Hour
Kilometers Per Hour	0.911	Feet Per Second
Meters Per Second	3.6	Kilometers Per Hour
Meters Per Second	1.943	Knots
Meters Per Second	2.237	Miles Per Hour
Meters Per Second	3.281	Feet Per Second
Meters Per Second	196.85	Feet Per Minute

HYSPLIT REQUESTS

The HYSPLIT model is a useful parcel/plume trajectory tool for decision making pertaining to prescribed burns. It can also be used in emergencies such as wildfire situations and accidental toxic releases. A request of a run of HYSPLIT can be made in a Spot Forecast request by entering the word HYSPLIT and the requestor's e-mail address (for example, Hysplit<space>Joe.Public@governmentagency.gov) in the remarks section. When the request is submitted, the HYSPLIT model is run for the requested location at the National Oceanic and Atmospheric Administration's Air Resources Laboratory (NOAA ARL). The results will then be sent to the requestor's e-mail address as a GIF file. It usually takes just a few minutes. This capability will be available through the 2012 calendar year.

There is one thing that a requestor will have to take into consideration when requesting a HYSPLIT model run. The default starting height for the model is 500 meters, or around 1500 feet above ground level. This height should be fine IF there is thorough mixing through the lowest 1500 feet above ground level. However, if there is an inversion present below 1500 feet, this is NOT good due to light or calm winds below the inversion. In this case, a HYSPLIT request would need to be requested directly from the NOAA ARL website:

<http://ready.arl.noaa.gov/hysplit-bin/trajtype.pl>

1. Once there, leave the default choices and select NEXT.
2. Select a model. Use the Rapid Update Cycle (RUC), which incorporates current data and then re-runs the model out to 12 hours. If a longer period of time is desired, then select the North American Mesoscale (NAM) model. Select NEXT.
3. A matrix of different request parameters will appear. Go about half way down the page, and under "Level 1 height", change 500 to 0 for ground level. Scroll down and select "Request Trajectory".
4. On this page, the model numbers will be "grinding" and will eventually give a finished message and produce a GIF image plot in the results box. Open the GIF image. You now have your HYSPLIT model forecast!

There is a "bird's eye" trajectory forecast view of the plume, as well as a side view and height of the plume as well. These images can also be viewed in Google Earth (kmz) under "Display Options" on the request parameter page. This option can give the height of the parcel above ground level at several points in time.

A test of the HYSPLIT model run can be performed from the Spot Forecast request site by sending a “test HYSPLIT” spot request. Be sure to include “Hysplit<space>emailaddress@governmentagency.gov” in the remarks section, and include “test” in your project name.